

# **A NOVEL APPROACH TO OCEAN ALTIMETRY UTILIZING THE GPS SIGNAL**

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## **ABSTRACT**

When the GPS signal impinges on the ocean surface, it is scattered in all directions with maximum power in the direction of specular reflection. With an appropriate antenna, a receiver on board an aircraft/spacecraft viewing the transmitter in a suitable geometric configuration will receive the signal which has propagated from the transmitter to the ocean and has been scattered within the antenna beam. The process of signal acquisition is accomplished by cross correlating the received waveform with delayed replicas of the transmitted signal; when the output of the correlator is maximized the corresponding delay can be converted into a distance. By measuring the time of arrival and the level of power return in the specular direction we can detect the mean surface height and wind speed amplitude, respectively. Significant wave heights near the specular point can also be obtained from the shape of the power return. By examining the power return at different delays, different parts of the ocean are sensed. The body of this work illustrates our specific approach at determining the delay corresponding to the mean height of the specular reflection point, the significant wave height and EM bias. The procedure illustrated here is eventually going to be implemented in the receiver software for on-board data processing. Because of the wealth of GPS signals bouncing off the ocean surfaces, we believe that this new sensor will complement existing altimeters by allowing for improved temporal and spatial resolution.